AF/2811
JFW

Docket No.: GR 97 P 6457

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

Applic. No.	:	09/595,860 Confirmation No.: 2756
Inventor	:	Jörg Berthold et al.
Filed	:	June 16, 2000
Title	:	Integrated Circuit Having a Diffusion Blocker Configured as a Blocker Layer and Connection Pieces Composed of Aluminum Covering Contact Holes and Methods for Fabricating the Same
TC/A.U.	:	2811
Examiner	:	Cuong Q. Nguyen
Customer No.	:	**24131**

Hon. Commissioner for Patents
Alexandria, VA 22313-1450

Reply Brief

S i r :

In response to the Examiner's Answer dated April 21, 2004, kindly consider the following remarks:

Remarks:

The Examiner has stated in the last paragraph on page 4 and the first paragraph on page 9 of the Examiner's Answer that the silicon nitride layer 116 in Bothra et al. is materially identical to the diffusion blocker layer (160) of the invention of the instant application and thus the diffusion blocker layer of the prior art device would inherently impede and prevent a copper diffusion. Appelants respectfully disagree. The silicon nitride diffusion blocker layer 116 of Bothra et al. prevents moisture that cuases corrosion or contaminants to reach the semiconductor substrate (see column 4, lines 55-57). The moisture or contaminants may come from isotropic wet etching (see column 6, lines 3-11 and column 8, lines 32-42).

Since the invention of the instant application does not intend to remove a sacrificial layer through isotropic wet etching, Bothra et al. cannot teach using a silicon nitride barrier layer in a structure of the invention of the instant application. The Examiner was not able to show that the silicon nitride diffusion blocker layer 116 of Bothra et al. is intended to prevent the diffusion of copper. A person skilled in the art would not obtain any hint or suggestion from Bothra et al. to use layer 116 to prevent the diffusion

of copper in a semiconductor structure known from Cheek et al. and Cohen et al.

Appellants believe that the Examiner's conclusion that the diffusion blocker layer in the prior art would inherently impede and prevent diffusion of copper is based on inpermissive hindsight view. A person skilled in the art may know that silicon nitride as such is a blocker layer or has other effects for various purposes including the function to be blocker layer for the diffusion of copper. However, the question is why there would be any hint from Bothra et al. to use a silicon nitride layer to improve the structure known from, e.g., Cheek et al. and Cohen et al. and apply the silicon nitride layer thereto. This question was not answered by the Examiner.

A person skilled in the art learns from Bothra et al. to use silicon nitride to prevent moisture or contaminants from reaching the substrate, which come from wet etching of a sacrificial layer for the purpose of achieving an air dielectric. However, the invention of the instant application does not intend to achieve an air dielectric or avoid moisture and contaminants resulting from wet etching. Thus, a person skilled in the art may be aware of the silicon nitride layer 116 of Bothra et al., but he or she would not expect to derive

any advantage from using such a layer in a structure of Cheek et al. and Cohen et al. where an air dielectric and/or wet etching a sacrificial layer is not an issue at all. Without any foreseeable advantage in mind, a person skilled in the art would not intend to add a silicon nitride layer to the structure of Cheek et al. and Cohen et al. because it would make manufacturing more complex. It has, therefore, inventive quality to add an additional layer to the structure of Cheek et al. and Cohen et al., which makes manufacturing more complex but in this way, improves the overall reliability and quality of the resulting product which supersedes the additional effort implied with the use of a silicon nitride layer.

In view of the above and the Brief on Appeal dated January 26, 2004, the honorable Board is therefore respectfully urged to reverse the final rejection of the Primary Examiner.

Respectfully submitted,

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For Appellants

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